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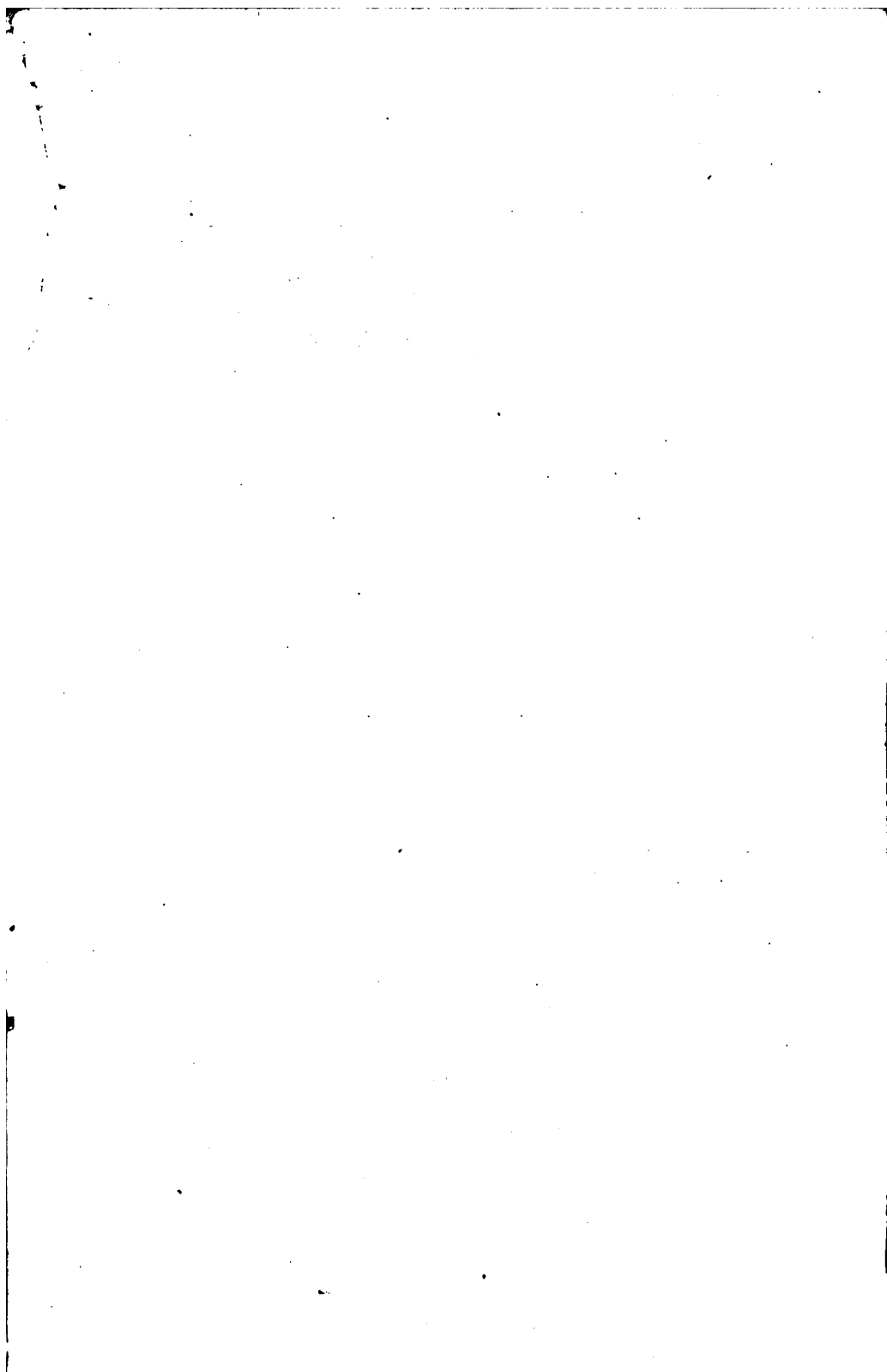
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THE
ANATOMY
OF THE
MUSCULAR SYSTEM
OF
THE HORSE.

BY
JAMES IRVINE LUPTON, M.R.C.V.S.

AUTHOR OF THE "ANATOMY OF THE EXTERNAL FORM OF THE HORSE;"
AND CO-AUTHOR OF "THE HORSE IN HEALTH AND DISEASE,"

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P R E F A C E.

Dr. Johnson has defined a big book to be a big evil—the author, therefore, of the few following pages bearing in mind this remark, has attempted to condense as much matter in as small a space as possible, and by this means, the exemplification of the motto “multum in parvo.” In preparing the first chapter, which considers the Physiology of Muscular Tissue, he has consulted and freely collected from Kölliker’s Manual of Histology, and Dr. Quain’s Anatomy, edited by Dr. Sharpey and Mr. Ellis. He is also pleased to acknowledge the assistance he has received, in constructing the second chapter, from notes taken during attendance at lectures delivered by Professors Spooner, Varnell, and Dr. Monastier, and to state that the engravings have been carefully selected from Chauveau’s work on the Anatomy of the Domestic Animals.

The work is written for the use of students; for whom, in the present instance, the author sincerely trusts he has not laboured in vain.

MYOLOGY.

MUSCULAR TISSUE.

General Nature.—Muscular tissue consists of fine fibres, which are, for the most part, collected into distinct organs, called muscles, familiarly known as the flesh of animals.

Contractility. Stimuli.—This tissue is endowed with contractility, by virtue of which it shrinks or contracts more or less rapidly under the influence of certain causes which are capable of exciting or calling into play the property in question, and which are therefore named stimuli.

Volition.—A large class of muscles, comprehending those of expression, respiration, and locomotion, and some others, are excited by the stimulus of the will, or volition, acting on the muscles through the nerves; although some of them habitually, and occasionally all, act in obedience to other stimuli.

Involuntary Muscles.—There are other

muscles which are entirely drawn from the control of the will, such as those of the heart and the intestinal canal; and these are accordingly named involuntary. These muscles differ both in the mode they are excited, and to a certain extent in their anatomical characters.

Voluntary Muscles.—The voluntary muscular fibres are for the most part gathered into distinct masses or muscles, of various sizes and shapes, but generally of an oblong form, furnished with tendons at either extremity, by which they are fixed to the bones.

Attachment, Origin, and Insertion.—The two attached extremities are anatomically named origin and insertion; the former being usually applied to the attachment which is considered most fixed, although the rule cannot always be strictly applied.

Belly. Biventral. Bicipital.—The fleshy part is named the belly, which in some cases is interrupted in the middle, or divided into two parts by a tendon, and then the muscle is said to be biventral or digastric: on the other hand, it may be cleft into two or three portions at one end, in which case it is called bicipital or tricipital, as the case may be.

Division into Fasciculi, Fibres, and

Fibrillæ.—The muscular fibres are collected into packets or bundles of greater or less thickness, named fasciculi or lacerti; the fibres themselves consist of much finer threads, visible alone by the aid of the microscope, which are termed muscular filaments, fibrillæ, or fibrils.

The Parallel Course of the Fibrils, Fibres, and Fasciculi. The Fasciculi of Voluntary Muscles, converge towards their Tendonous Attachments, but do not interlace.—The fibrils run parallel with one another in the fibres, and the fibres are parallel in the fasciculi; both extend continuously from one terminal tendon to the other, unless in such instances, as the dygastricus, in which the fleshy part is interposed tendinous tissue. The fasciculi also very generally run parallel; and although in many instances they converge towards their tendinous attachment with various degrees of inclination; yet in the voluntary muscles they do not interlace one another.

Sheath to Muscle. Sheath of Areolar Tissue to the Fasciculus.—An outward sheath of areolar tissue surrounds the entire muscle, and sends partitions inwards between the fasciculi, furnishing to each of them a special sheath.

Areolar Tissue only partially invests

the Fibres.—The areolar tissue extends also between the fibres, but does not afford to each a continuous investment, and therefore cannot be said to form sheaths for them. Every fibre, it is true, has a tubular sheath, but this is not derived from the areolar tissue. The areolar tissue of the sheath is composed of yellow elastic and some white fibres; but the elastic element is found principally in its investing, as distinguished from its penetrating portion.

Uses of the Areolar Tissue.—The chief uses of the areolar tissue are, no doubt, to connect together the fibres and fasciculi, and to act as a nidus for the ramifications of blood-vessels and nerves.

Fasciculi. Shape, Size, Form and Arrangement.—The fasciculi are of prismatic figure, and their sections have therefore an angular outline. The number of fibres of which they consist varies, so that they differ in thickness; and a large fasciculus may be divisible into two or three orders of successively smaller bundles, but of no regularly diminishing magnitude. Some muscles have large, others only small fasciculi, and the coarse or fine texture of a muscle depends on this circumstance.

Penniform. Semi and Compound Penniform.—The length of the fasciculi, and consequently that of the fibres and filaments, is not

always proportioned to the length of the muscle, but depends on the arrangement of the tendons to which their extremities are attached. When the fasciculi have to pass from one extremity to the other of a long muscle, then the tendons are limited at each end, and the fasciculi are in this case of great length. But a long muscle may be made up of a series of short fasciculi, attached obliquely to one or both sides of a tendon, which advances some way upon the surface, or into the midst of the fleshy part. Muscles of the kind last referred to are named penniform, from their resemblance to the plume of a feather; and other modifications of the arrangement are named semi-penniform and compound penniform. Many short fasciculi connected thus to a long tendon produce, by their combined effect, more forcible contraction than a few fasciculi running nearly the whole length of the muscle.

Fibres. Their Size. Striæ, or Striated Muscular Fibre.—The fibres, although they differ somewhat in size individually, have the same average diameter, viz. $\frac{1}{400}$ inch. When viewed with transmitted light, with a sufficiently high power of the microscope, the fibres, which are then clear and pellucid in their aspect, appear marked with fine dark lines (parallel) passing across them directly or somewhat obliquely, at exceedingly short but regular inter-

vals. The lines, as just mentioned, are dark, the intervals pellucid. This cross striped appearance, which is most beautiful and characteristic, is found in all voluntary muscles, but it is not altogether confined to them. Striped fibres occur in the heart, pharynx, and upper part of the gullet, internal ear, urethra, parts which are not under the direct control of the will.

Fibres do neither divide nor anastomose. Exceptions.—Generally speaking, the fibres neither divide nor anastomose, but maintain an undivided course from one extremity to the other. This, however, is not without exception. Branched and anastomosing fibres are common in the heart, and in the tongue of the frog.

At the Surface they divide, but do not anastomose.—The muscular fibres, as they approach the surface, divide into numerous, but *not* anastomosing branches by which they are attached to the under surface of the mucous membrane; the fibres of the fascial muscles of mammals have been shown by Busk and Huxley to divide in a similar manner when they fix themselves to the skin.

Structure of Fibres. Sarcolemma.—Each fibre is made up of a large number of extremely fine filaments or fibres, inclosed in a tubular sheath. The proper sheath of this fibre, which was dis-

covered nearly at the same period, independently by Schwann and Bowman, has been named by the latter "sarcolemma." It consists of a transparent and apparently homogeneous membrane, and being comparatively tough and elastic, will sometimes remain entire, when the included fibrils are ruptured by stretching the fibres.

It may be doubted whether the existence of a distinct sarcolemma is universal in striated muscles. Busk and Huxley state that they have been unable to detect it in the muscular fibrils taken from the heart and tongue.

Fibrils. Sarcous Elements.—Lines and fissures are sometimes seen running lengthways in the substance of the fibres, indicating their fibrillar structure. When the longitudinal lines are well marked, the transverse striæ are comparatively indistinct. In a thin transverse section, the ends of the fibrils may be seen, when highly magnified, as small dots or points, which occupy the whole sectional area of a fibre, showing plainly that it is not hollow, as has sometimes been maintained, but possesses the same fibrillar structure throughout its whole thickness. When a fibril is completely insulated and highly magnified, it is seen to consist of a single row of minute particles, connected together like a string of beads. These particles, named by Bowman,

“sarcous elements,” when viewed with a high magnifying power of 400 or 600, appear like little dark quadrangular and generally rectangular bodies, with bright intervals between them, as if they were connected together by some pellucid substance; but on further examination a faint or dark line is seen passing across the fibril in the middle of each of the bright spaces, and sometimes a bright border may be perceived on either side of the fibril, so that each of the bodies then appears to be surrounded by a bright area having a similar quadrangular outline. It may therefore be inferred that the pellucid substance surrounds it on all sides. When the focus is altered, the internal dark part becomes light. It is therefore evidently transparent, and its dark aspect is probably owing to its refracting light differently from the surrounding substance.

Course of the Cross Striæ. Transverse Cleavage of Fibres.—When the fibrillæ lie undisturbed in the fibre, the elementary particles of collateral fibrils are situated in the same transverse plane, and it is to this lateral coaptation of the particles that the transverse striping of the fibre is due. The fibres often show a tendency to cleave across in the direction of these lines, and even to break up into transverse plates or disks, which are formed by the

lateral cohesion of the particles of adjacent fibres. Therefore it will be readily understood that each fibril contributes a particle, which separates from those of its own fibril, but joins its neighbours on either side, and this with perfect regularity.

Bowman states that the elementary particles are nearly of a uniform size in mammalia, birds, reptiles, fishes, and insects.

Corpuscles in the Fibres. Fusiform Corpuscles.—A number of pale, finely granular, oval corpuscles, resembling cells or cell nuclei, are scattered among the fibrillæ, in the substance of the fibres, upon the inner surface of the sarcolemma. They have been supposed to be connected with the growth and nutrition of the muscle. They are obvious in the foetus some time before birth, but afterwards the addition of acetic acid is necessary to render them visible. Other corpuscles are reckoned along with them, distinguished by Mr. Ellis under the name, fusiform corpuscles, with pointed ends, sometimes truncated, but often twisted and subdivided.

These have a very dark outline, with scarcely a granular interior. They are similar to the fusiform corpuscles brought into view by acetic acid in nerves and tendons, and are considered by Ellis to be the same nature as those belonging to the so-

called nuclear or elastic fibres of connective tissue. Accordingly they appear to be seated, not in the muscular fibres, but in the tissue investing the fibres.

Connection with Tendons.—Mr. Ellis describes the connection of a striated muscle with a tendon as taking place in all cases in the following manner. When a muscular fibre is about to end in a tendon, its component fibrils are collected into bundles of different lengths and sizes, like the roots of a tree. Around each bundle, tendonous tissue is collected forming a sheath, which appears gradually to cease as it is continued backwards on the undivided fibre, but how it is attached is not apparent.

Professor. Kölliker states that the mode of connection differs when the muscular fibres are continuous in a direct line with those of the tendon, from that which is observed when the former join the latter at a more or less acute angle.

In the first case the two are directly continuous, the muscular fibre being distinguishable from that of the fibrous tissue by its striation alone.

In the second case, the muscular fibres terminate in conical processes, which are received into corresponding depressions in the tendonous fibres, the connective tissue of the one being continuous with that of the other.

Blood-vessels of Muscle and their Arrangement.—The blood-vessels of muscular tissue are extremely abundant ; so that when they are successfully filled with coloured injection, the fleshy part of the muscle contrasts strongly with its tendinous portion. The vessels, ‘arteries and veins,’ pass among the fasciculi, crossing over them, and dividing more and more as they get between the finer divisions of the muscle, at length, penetrating the smallest fasciculi, they end in capillary vessels, which run between the fibres. The vessels are supported in their progress by the subdivision of the sheath of a muscle, to which also they supply capillaries.

The capillaries destined for the proper tissue of the muscle are extremely small. They form among the fibres a network, with narrow oblong meshes, which are stretched out in the direction of the fibres. In other words, they consist of longitudinal and transverse vessels, the former running parallel with the muscular fibres, and lying in the angular intervals between them, the latter, which are much shorter, cross between the longitudinal ones, and pass over or under the intervening fibres.

Capillaries not entering the Sarcolemma.—None of the capillary vessels enter the sarcolemma or proper sheath of the fibre ; the nutritive

fluid which they convey must therefore reach the finer elements of the muscle by imbibition

Lymphatics.—Nothing certain is known. From an examination of the lymphatics which appear to proceed from different muscles, Kölliker infers that small muscles are destitute of such vessels, and that the few which issue from some of the larger muscles belong to the sheath and its larger subdivisions, and not to the muscular tissue (proper).

Nerves. Their Distribution in Muscle.

—The nerves of a voluntary muscle are of a considerable size. Their branches pass between the fasciculi, and repeatedly unite with each other in form of a plexus, which is chiefly confined to the muscular division to which it belongs.

From one or more of such primary plexuses, nervous twigs proceed and end in finer or terminal plexuses formed by slender bundles, consisting of two or three primitive tubules each ; some of them separating into single tubules.

These nervous bundles and single tubules may be discovered between the muscular fibres, after a longer or a shorter course, they return to the plexus, and cross the direction of the muscular fibres directly and obliquely, forming wide arches, on their return they either rejoin the larger nervous bundles from which they set out, or enter into other

divisions of the plexus. The nervous filaments are said to form loops or strings among the muscular fibres. The terminations, with or without previous division, have also to be traced in the muscles of man and mammalia. It has been thought that the finely divided nerve in the muscles of amphibia finally penetrate the sarcolemma, and mingle with the muscular fibrils, but this still remains a question.

Nerves of small size accompany the branches of blood-vessels within muscles, but do not reach the capillaries, though destined for the vessels. These vessels sometimes communicate with the proper muscular plexuses.

INVOLUNTARY MUSCLES.

Plain Fibres. Corpuscles. Dotted Fibres.—The involuntary muscular tissue differs from the voluntary kind. The most remarkable difference is observed in the aspect of the fibres, which, except in the heart and a few instances, are unmarked by the cross lines so characteristic of the striped fibre. These plain or unstriped fibres are generally of a pale colour. Under the microscope they have a peculiar soft aspect. They are marked at short intervals with oblong corpuscles, which give them a very characteristic appearance, especially after

the application of acetic acid, which renders the corpuscles more conspicuous. The substance of the fibres is not translucent, but clouded, or even finely granular; and in the latter case the granules are sometimes arranged in longitudinal lines. Mr. Bowman considers this last-mentioned appearance as indicative of an approximation towards the structure of the striped fibre, for he has observed the granules to be about the size of the elementary particles of the voluntary muscle already described. Mr. Ellis says the fibres agree generally in structure with those of voluntary muscle, being similarly made up, and parallel, though apparently the fibrils are smaller, each of which consists of a row of particles or sarcous elements having the appearance of minute oblong spots. These spots are distinct from each other in the fibre and give to it a more or less regularly dotted aspect, which Mr. Ellis regards as characteristic of these fibres, wherever they occur. These fibres appear to have no sarcolemma.

Arrangement of Plain Fibres.—The plain fibres are, for the most part, disposed between the coats of the membranous viscera, as the stomach, bladder, air-tubes, exentory, ducts of glands, and the like. That fasciculi usually interlace each other, and are connected at their ends with tendonous tissue.

Where Found.—The plain muscular fibres are found in the lower half of the gullet, the stomach, intestinal canal, trachea, bronchial tubes, bladder, uterus and appendages, corpora cavernosa, ciliary muscle and iris, the middle coat of arteries, many veins and larger lymphatics, in certain parts of the skin, and in form of minute muscles attached to the hair follicles.

The tissue of the heart differs also from most other involuntary muscular structures by its deep colour, but it agrees with them in the interlacement of the fasciculi.

Chemical Composition of Muscular Fibre.—The characteristic constituent of muscular fibrin is a peculiar sort of fibrin, which differs somewhat from blood-fibrin. It has been proposed to name it “syntonin.” It is insoluble in a solution of nitrate or carbonate of potash, but is readily soluble in dilute, hydrochloric acid.

Development of Muscle.—Valentin and Schwann, the first to represent this circumstance, state that the muscular fibres are derived from nucleated cells, which coalesce together in rows, and undergo other changes. Nuclei being formed in a soft blastema, and arranged in linear series, become surrounded with delicate envelopes, so as to form a string of cohering cells, which contain, besides

the nuclei, a few detached, round granules, by absorption of their adhering parts; they coalesce into a tube; and within the tube so produced, the fibrillæ begin to be formed by deposition and by the linear arrangement of their elementary particles. The formation of the fibrils goes on until they fill the tube, and after this, according to Schwann, become the sarcolemma; but the last-mentioned point is doubtful; and there is great reason to believe that the sarcolemma is a subsequent formation. The nuclei remain for a time in the axis of the growing fibre—a condition which is persistent in the muscles of insects, but in higher animals they become dispersed among the fibrils, and increase in numbers. Muscular tissue is not regenerated in warm-blooded animals when a portion of muscle is cut out: the breach will heal, but the loss of substance is not repaired by new-formed muscular tissue, but by tendinous interposition.

CHAPTER II.

THE MUSCULAR SYSTEM.

THE first step to be taken in the dissection of most animal bodies is the removal of the skin, in order to expose the subjacent muscles. This covering in the horse is so closely attached, through the medium of fascia, &c., to a muscle, the panniculus carnosus, that it is not without difficulty that the former can be separated from the latter.

This muscle is spread over nearly the whole surface of the body, the sides of the neck, flanks, and extremities alone being excepted, and is attached internally to some of the most prominent parts of the skeleton, viz. to the styloid process of the occiput, the external tuberosity of the humerus, the dorsal spines, and the antero-inferior spinous process of the ileum. It also firmly adheres to and fastens into the formation of the orbicularis oris. Its action is to corrugate the skin, and so sudden and rapidly does it perform this office, that it dis-

lodges flies or other irritating matter, such as dust or dirt, which have not been previously glued to the coat by any adhesive agent.

ABDOMINAL REGION.

The abdominal muscles, four in number, constitute the lower walls of the belly, and together form as it were a strong sheet, through the medium of which the intestines and abdominal organs are kept in position. After reflecting the skin, they are seen to be covered by the panniculus carnosus, and a thick layer of yellow elastic tissue (always very dense over the abdomen of the brood mare.) This must be dissected away in order to expose the subjacent muscles; when the following lines of demarcation will be brought into view.

First. Linea Alba which occupies the median line extending from the os pubis to the ensiform cartilage, and consists of dense white fibrous tissue, forming the point of junction for the abdominal muscles on the right side with those situated on the left. At a little more than a third of its length from the pubis, is found a lozenge-shaped space, in which this tissue is almost entirely absent, and through which, in the foetus, the umbilical vessels pass. This is the umbilicus or navel of the adult.

Second. On the surface of the rectus are several white transverse lines—the lineæ transversales.

Third. Near the edge of the rectus commences the linea semi-lunaris, which marks the union of the fleshy with the tendinous portion of the external oblique.

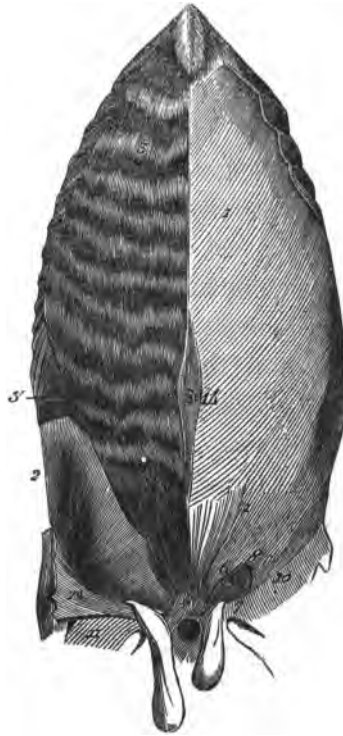
Obliquus abdominis externus is situated on the lateral parts of the belly. *Origin*—from the antero-inferior spinous process of the ileum, the symphysis pubis, two strong divisions, between which a triangular space is formed, called the external abdominal ring. The posterior of which, stretching from the ileum to the os pubis, is called the crural arch, and corresponds, in human anatomy, with Poupart's ligament, and from fascia lumborum. *Insertion*—by fleshy slips to the fourteen hindermost ribs, which indigitate with the serratus magnus and latissimus dorsi, ensiform cartilage, and the whole length of the linea alba. *Action*—it flexes the pelvis on the thorax, and has the power of contracting, and, by this means of expelling the fæces, and in the mare the foetus; it also serves to force up the diaphragm, and thus to aid in expiration.

Obliquus Abdominis Internus lies above the foregoing muscle. *Origin*—from the transverse processes of the lumbar vertebræ, antero-inferior spi-

nous process of the ileum, and symphysis pubis. *Insertion*—to the inner surface of the cartilages of the three or four last ribs, linea alba, and to the ensiform cartilage. *Action*—to expel the urine, and to act as above. Like the last, it is also a muscle of respiration.

Transversalis Abdominis is still further above the last-mentioned muscle. *Origin*—from the transverse processes of the lumbar vertebræ, antero-inferior spine of the ileum, and symphysis pubis. *Insertion*—to the inner surface of all the ribs, except the three last, linea alba, and ensiform cartilage. (The three last muscles form the abdominal ring.) *Action*—to assist the two muscles above, and to support the burden of the viscera.

Rectus Abdominis is placed on each side the median line beneath the viscera. *Origin*—from the symphysis pubis. *Insertion*—to the cartilages of all the ribs, except the three first, linea alba, ensiform cartilage, and four posterior bones of the sternum; it blends with the lateralis sterni, a muscle covering the lateral parts of the sternum. It forms the internal abdominal ring. *Action*—to brace the middle parts of the belly, and to contract the thoracic cavity.



VIEW OF THE ABDOMINAL MUSCLES.

1. Aponeurosis of Obliquus Abdominis Externus. 2 Portion of Obliquus Abdominis Internus. 3. Obliquus Abdominis Externus. 3^d. Transversalis Abdominis. 4. Tendon common to the four Abdominal Muscles. 5. Inguinal Space. 6. Anterior pillar. 7. Posterior Pillar. 8. External Commissure. 9. Internal Commissure 10. Posterior Border of Obliquus Abdominis Externus. 11. Aponeurosis of Cruralis. 12. Portion of Obliquus Abdominis Externus, reflected in order to expose the crural arch, denominated in human anatomy Poupart's Ligament. 14. Umbilicus or navel.

DIAPHRAGMATIC REGION.

Diaphragma.—The abdomen is bounded anteriorly by a muscular wall, called the diaphragm or midriff. The diaphragm is a transverse muscular septum, which separates the thorax from the abdomen. The thoracic surface is concave and covered with pleura. The abdominal surface is convex and covered with peritoneum. The muscle, for description, is divided into three portions: a central or codiform portion; a lateral or muscular portion; and into two superior muscular parts, or crura. *Origin*—supero posteriorly. From the inferior surface of the bodies of the five anterior lumbar vertebræ, and from the inferior surface of the body of the last dorsal vertebræ. *Insertion*—externo-lateral. To the infero-internal surface of all the false ribs (just above the costo chondric articulation), (except the last), and slightly to the cartilage of the last true rib. *Insertion*—infero-anterior. To the supero-internal surface of the ensiform cartilage. This muscle digitates with the transversalis abdominis. Crura; a right and left crus. The right is long, the left is short. The crura join together by a common tendon at the lumbar vertebræ. The diaphragm is formed by three holes, or foramina. First, by one in the middle, the hiatus

aorticus, which receives in their course, the aorta, thoracic duct, and vena azygos. Secondly, on the right by the foramen dextrum, through which the posterior vena cava passes; and thirdly, in the left by the foramen sinistrum which gives passage to the œsophagus, gastric arteries, pneumogastric phrenic artery, circumflex arteries of the ileum, phrenic nerves. *Action*—a muscle of respiration.

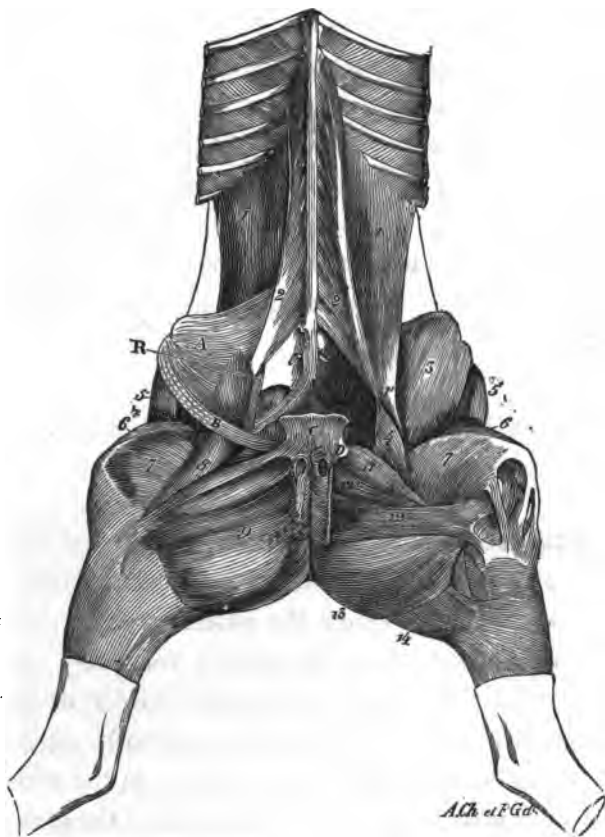
MUSCLES OF THE ABDOMEN.

INTERNAL LUMBAR REGION.

Intertransversales Lumborum are situated between the transverse processes of the lumbar vertebræ. *Origin*—from the anterior parts of the transverse processes of the lumbar vertebræ. *Insertion*—to the posterior sharpened border of the transverse processes of those just anteriorly placed.

Sacro Lumbalis is deeply seated in the loins, above the psoæ muscles. *Origin*—from the under part of the body of the sacrum. *Insertion*—to the under part of the transverse processes of all the lumbar vertebræ and the last rib.

Semispinalis Lumborum is a part and parcel of a continuous chain of muscles, called as to situation of the neck, colli—of the back, dorsi—and of



THE INTERNAL AND DEEP-SEATED MUSCLES OF THE ABDOMEN, AND
INNER PART OF THE THIGH.

1. Psoas Magnus. 2. Psoas Parvus. 3. Iliacus. 4. Internal portion of Iliacus. 5. Tensor Vaginæ. 6. Rectus Femoris. 7. Vastus Internus. 8. Sartorius. 9. Gracilis. 11. Pectineus. 12. Adductor Longus. 12' Adductor Brevis. 13. Semi-membranosus. 14. Semi-tendinosus. B. Portion of the Obliquus Abdominis Externus, reflected to bring in sight the crural arch. C. Tendon common to the Abdominal Muscles. D. Origin of the Pubio-Femoral Ligament.

the loins lumborum. *Origin*—from the oblique processes of the two anterior sacral bones. *Insertion*—to the posterior border of the spine of the first sacral bone and last lumbar vertebræ.

The action of the three foregoing muscles is to approximate the pelvis to the thorax, and thus to stretch the dorsal muscles by arching the back.

Psoas Magnus is situated on the postero-lateral parts of the spine and superior part of the inlet of the pelvis. *Origin*—from the inferior surfaces of the bodies of the two last dorsal vertebræ and from the inferior surface of the transverse process of all the lumbar vertebræ, and from the inferior surface of the first sacral bone. *Insertion*—to the inner surface of the two last ribs, just above their angles, and to the trochanter minor internus of the femur. This muscle is externally covered with peritoneum. *Action*—to flex the haunch upon the pelvis, or if the hind leg is fixed to assist the three last muscles in arching the back.

Iliacus occupies the iliac fossa, and thence extends along the internal part of the haunch. *Origin*—from the superior two-thirds of the venter surface of the ileum, and from the under part of each tubercle on the spinous processes of the ileum, viz.: “antero-inferior and supero-posterior.” *Insertion*—to the trochanter minor internus of the

femur, it passes over the capsular ligament of the hip joint. *Action*—to flex the haunch.

Psoas Parvus is situated upon the internal part of the haunch. *Origin*—from the inferior surface of fifteen, from it to the eighteenth inclusive, and from the inferior surface of transverse processes of all the lumbar vetebrae and last bone of the sacrum. *Insertion*—to a tubercle on the brim of the pelvis, just above the acetabulum joint. *Action*—to assist in arching the spine.

MUSCLES WHICH ATTACH THE FORE EXTREMITY TO THE TRUNK.

Trapezius is situated on the side of the withers and neck. *Origin*—cervical portion; from the ligamentum colli, as far anteriorly as the third cervical vertebra, and posteriorly as the second dorsal vertebral spine. *Origin*—dorsal portion; from the spines of the dorsal vetebrae extending as far posteriorly as the eleventh, commencing at the second dorsal vetebrae as far back as the eleventh, the origin is muscular, from the eleventh to the seventeenth it is tendinous. *Insertion*—to a tubercle on the spine of the scapula. *Action*—to elevate the scapula, and draw it forwards and backwards.

Latissimus dorsi is situated on the lateral part of the chest and back. *Origin*—from the ligamentum colli as far anteriorly as the second dorsal spine, and posteriorly as far as the fascia lumborum at the eleventh dorsal spine. *Insertion*—to the rough tubercle on the inner side of the body of the humerus. *Action*—to draw the humerus upwards and backwards.

Rhomboideus Longus is situated on the supero-lateral part of the neck. *Origin*—from the lateral part of the ligamentum colli as far anteriorly as the third cervical vertebra, and posteriorly as the anterior part of the second dorsal spine. *Insertion*—to the inner surface of the superior angle, border, and cartilage of the scapula. *Action*—to draw the scapula upwards and forwards.

Rhomboideus Brevis, lying upon the side of the withers, has its *Origin*—from the spines of the second, third, and fourth dorsal vertebræ. *Insertion*—to the inner part of the superior border and cartilage of the scapula. This muscle is clothed externally with yellow elastic issue. *Action*—to elevate the scapula and to draw it backwards.



VIEW OF THE INFERIOR MUSCLES OF THE NECK AND CHEST.

2. 3. Levator Humeri. 4. Sterno Maxillaris. 5. Subscapulo Hyoideus.
6. 7. Sterno-thyro Hyoideus. 8. Scalenus. 9. 10. Pectoralis Transversus.
11. Pectoralis Magnus. 12. Portion of Coraco Radialis. 13. Pectoralis
Parvus. 14. Terminal Aponeurotic Expansion of the same.

PECTORAL REGION.

Pectoralis Transversus is placed on the lateral, anterior, and posterior parts of the breast. *Origin*—from the lateral and posterior parts of the cariniform cartilage, over which it plays, being lubricated by synovia, and meets its fellow by a white tendinous line. *Insertion*—to the antero-inferior part of the body of the humerus, “scaber canalis,” and the fascia covering the leg. *Action*—it acts as a sling to support the trunk, and to keep the arm close to the chest during locomotion.

Pectoralis Magnus is situated on the infero-lateral part of the thorax. *Origin*—from the fourth, fifth, and sixth bones of the sternum, ensiform cartilage, and the cartilage of the four true ribs. It is attached by fascia to the external oblique muscle of the abdomen. *Insertion*—bifid, one portion, to the internal tubercle at the head of the humerus; the other consists of a few fibres, which pass over to the external tubercle on the head of the humerus. *Action*—to draw the shoulder downwards and backwards.

Pectoralis Parvus lies between the fore-leg and side of the thorax. *Origin*—from the lateral part of the cariniform cartilage, and slightly from the four anterior bones of the sternum. *Insertion*—to the

outer tubercle at the head of the humerus, and to the supero-anterior border of the scapula, reaching nearly to its antero-superior angle. *Action*—to assist the last-named muscle.

Serratus Magnus is situated between the shoulder-blade and side of the chest. *Origin*—from the transverse processes of the four posterior cervical vertebræ, from the entire length of the first, second, third, fourth, and fifth ribs as low as their cartilages; from the sixth, seventh, and eighth as low as their middles; it digitates with four portions of the external oblique muscle. *Insertion*—to the superior border, and by a few fibres to the ventral surface and cartilage of the scapula. *Action*—it tends greatly to support the trunk in a sling, especially when the weight of the body comes down with a sudden shock, as in jumping. The two muscles are more or less concerned in all the motions of the scapula, and will become dilators of the chest whenever they are contracted, while the limbs remain fixed points.

Levator Humeri is situated on the antero-inferior, and lateral parts of the neck. *Origin*—from the mastoid process of the petrous portion of the temporal bone, crest of the occipital bone, wing of the atlas, and transverse processes of the second, third, fourth, and sometimes fifth cervical ver-

tebræ. *Insertion*—slightly to the spine of the scapula and shoulder-joint; to the inferior part of the ridge of the humerus, that extends from the outer part of the outer tubercle; and to a depression; “scaber canalis,” or the antero-inferior part in common with the pectoralis transversus. *Action*—to raise and draw the shoulder forwards; to turn the neck on one side; or, should both muscles act at one and the same time, to depress the head.

Subscapulo Hyoideus is situated on the antero-superior part of the neck. *Origin*—from the supero-internal part of the body of the humerus, just below the inner tubercle. *Insertion*—to the underside of the root of the spur process of the os hyoides. *Action*—to depress the os hyoides, or, if that is fixed, to aid the last muscle in lowering the head.

MUSCLES OF THE FORE EXTREMITY.

The ten foregoing attach the fore extremity to the trunk, which, being dissected off, leave the fore limb at our disposal for anatomizing.

The muscles of the fore extremity are classed in three divisions—viz, those of the shoulder, arm, and leg.



VIEW OF THE EXTERNAL MUSCLES OF THE FORE EXTREMITY.

1. Scapulo Humeralis Externus. 1. Teres Externus. 2. Antea Spinatus.

3. *Postea Spinatus*. 4. Insertion of *Postea Spinatus*. 5. *Coraco-Radialis*. 6. Insertion of. 7. *Caput Magnum*. 8. *Caput Medium*. 9. *Anconeus*. 11. *Extensor Metacarpi Magnus*. 14. *Extensor Pedis*. 15. *Extensor Metacarpi Obliquus*. 16. *Extensor Suffraginis*. 18. *Flexor Metacarpi Externus*. 21. *Flexor Pedis perforatus et Perforans*. 22. Tendon of *Perforans*. 24. Tendon of *Perforatus*.

EXTERNAL SCAPULAR REGION.

Antea Spinatus lies upon the anterior fossa of the scapula. *Origin*—from the anterior angle border, fossa, and anterior surface of the spine of the scapula. *Insertion*—bifid. One to the outer, the other to the inner tubercle at the head of the humerus, this insertion extends from the tubercular summits to a roughened depression, just posteriorly placed to each. This bifid insertion embraces the tendon of the flexor brachii. *Action*—to draw the scapula into the same line with the humerus.

Postea Spinatus is situated upon the posterior fossa of the scapula. *Origin*—from the posterior angle border, fossa, and posterior surface of the spine of the scapula. *Insertion*—bifid. One portion to the postero-external tubercle; the other is tendinous, and passes over the postero-external tubercle to a depression just below the outer tubercle. *Action*—to flex the scapula on the humerus.

ANTERO-INFERIOR SCAPULAR REGION.

Coraco Humeralis is situated on the infero-internal part of the shoulder. *Origin*—from a tubercle on the inner side of the coracoid process of the scapula. *Insertion*—bifid. One portion to a tubercle on the middle third of the antero-internal part of the body of the humerus; the other passes over the insertions of the teres, internus, and latissimus dorsi, just below which points it is inserted. *Action*—to extend the humerus and to draw it inwards.

Flexor Brachii is placed upon the antero-inferior part of the shoulder. *Origin*—from the antero-inferior part of the coracoid process of the scapula passing over the trochlea formed by the tubercles of the humerus. *Insertion*—to the supero-anterior an inner part of the body of the radius. *Action*—to extend the radius, and at the same time to elevate it.

THE INTERNAL SCAPULAR REGION.

Subscapularis fills up the vent scapulæ. *Origin*—from the two inferior thirds of the ventral surface extending from the anterior to the posterior border of the scapula. *Insertion*—to the inner ridge just below the lesser tubercle of the humerus. *Action*—to draw the humerus inwards.



VIEW OF THE INTERNAL MUSCLES OF THE FORE EXTREMITY.

1. Subscapularis. 2. Teres Internus. 3. Tendon common to the Latis-

36 POSTERO-INTERNAL SCAPULAR REGION.

simus Dorsi and Teres. 4. Portion of Latissimus Dorsi. 6. Coraco Humeralis. 9. Portion of Pectoralis Anticus. 11. Flexor Brachii. 12. Insertion of. 15. Caput Parvum. 16. Caput Magnum. 17. Caput Medium. 18. Flexor Metacarpi Medius. 19. Flexor Metacarpi Internus. 20. Tendon of the Perforans and Perforatus. 24. Extensor Metacarpi Magnus.

POSTERO-INTERNAL SCAPULAR REGION.

Teres Internus vel Major is situated upon the posterior part of the shoulder. *Origin*—from the inner surface of the supero-posterior angle, and from a slight indentation internally placed to the posterior border of the scapula. *Insertion*—to the rough tubercle on the inner side of the body of the humerus, in company with the latissimus dorsi. *Action*—to draw the humerus inwards.

Scapulo Ulnaris lies upon the posterior part of the shoulder. *Origin*—from the supero-posterior and inner part of the scapula, extending from its angle to just above its glenoid cavity. *Insertion*—to the postero-internal part of the ulna, extending from its summit to where the ulna joins the radius. *Action*—to assist the caput magnum.

Scapulo Humeralis Posticus is situated upon the posterior part of the shoulder. *Origin*—bifid. From the superior two-thirds of the inner surface of the posterior border of the scapula, the other from above the postero-internal surface of the glenoid cavity. *Insertion*—to the supero-posterior

part of the humerus. *Action*—it acts as an elastic ligament.

Triceps Extensor Brachii (Caput Parvum) is situated on the infero-internal part of the shoulder. *Origin*—from the internal and middle third of the humerus. *Insertion*—to a tubercle on the supero-internal part of the ulna. *Action*—to extend the arm.

POSTERO-EXTERNAL SCAPULAR REGION.

Triceps Extensor Brachii (Caput Magnum) is situated upon the infero-posterior part of the shoulder, occupying the angular interspace between the scapula and humerus. *Origin*—from the whole length of the posterior border as high up as the supero-posterior angle of the scapula. *Insertion*—to the inner and upper part of the olecranon. *Action*—to approximate the scapula and humerus, and thus raise the elbow joint, if the former is fixed.

Triceps Extensor Brachii (Caput Medium) lies upon the infero-external part of the shoulder and humerus. *Origin*—from just behind a ridge at the postero-external part of the superior third of the humerus. *Insertion*—to the supero-external and posterior part of the ulna. *Action*—to flex the elbow joint.

Teres Externus is situated upon the postero-

external part of the shoulder. *Origin*—from a little tubercle just below the supero-posterior angle and border of the scapula. *Insertion*—to a ridge descending from the outer tubercle of the humerus, and to the ligament which extends from the outer tubercle to the outer condyle of the same bone. *Action*—to flex the scapula on the humerus.

Scapulo Humeralis Externus lies upon the postero-external part of the shoulder. *Origin*—from the inferior two-thirds of the posterior border of the scapula, just above the glenoid cavity, and from its dorsal surface. *Insertion*—to the middle of the ridge extending from the outer tubercle of the humerus. *Action*—to flex the humerus, and draw it outwards.

THE ANTERO-EXTERNAL HUMERAL REGION.

Humeralis Externus lies on the infero-external side of the shoulder. *Origin*—from the supero-posterior inner and outer surface of the body of the humerus, and winds round that bone. *Insertion*—to the supero-anterior and internal part of the radius, with the tendon common to the pectoralis transversus and levator humeri. *Action*—to flex the arm.

THE POSTERO-INFERIOR HUMERAL REGION.

Aconeus is situated upon the hollow space between the condyles. *Origin*—from the supero-posterior part of the lower third of the humerus. *Insertion*—to the antero-external border of the ulna and capsular ligament of the joint. *Action*—to extend the elbow, and to protect the capsular ligament, during the action between the two bones.

MUSCLES OF THE ARM AND FORE LEG.

Extensor Metacarpi Magnus is situated on the anterior part of the arm. *Origin*—from a ridge situated at the antero-external part of the humerus, and also from a depression just above the external condyle of the humerus. *Insertion*—to the antero-superior part of the os metacarpi magnum. *Action*—to extend the leg.

Extensor Pedis is situated upon the antero-external part of the arm. *Origin*—from the fore-part of the external condyle of the humerus, and from a ridge just superiorly placed to it; from the outer part of the head, and from the anterior and supero-external part of the body of the radius; and from the capsular ligament of the elbow joint. *Insertion*—to the coronal process the os pedis, and ad-

heres firmly to the capsular ligament of the fetlock joint. *Action*—to extend the knee, metacarpals, and pasterns of the fore extremity, and to elevate the toe.

Flexor Metacarpi Externus is situated upon the postero-external side of the arm. *Origin*—from a ridge on the external surface of the heel process of the external condyle of the humerus. *Insertion*—bifid; one to the supero-posterior part of the trapezium; the other passes through a sheath to the head of the external small metacarpal bone. *Action*—to flex the leg.

Flexor Metacarpi Medius lies on the postero-internal part of the arm. *Origin*—bifid; one from the middle of a ridge extending along the internal condyle of the humerus; the other from the supero-internal and posterior part of the ulna. *Insertion*—bifid; one part to the supero-posterior part of the os pisiforme, and to the posterior articular ligament; the other to the postero-internal part of the head of the inner small metacarpal bone. *Action*—to flex the leg.

Flexor Metacarpi Internus is situated on the postero-internal side of the arm. *Origin*—from a ridge behind the internal condyle of the humerus. *Insertion*—to the head of the os metacarpal par-

vum; previous to its insertion, it enters a sheath formed by the armular ligament. *Action*—to flex the leg.

Flexor Pedis et Perforatus is situated on the posterior part of the arm. *Origin*—common to both muscles, from a ridge on the heel process of the internal condyle of the humerus. *Insertion*—of perforatus bifid, to the external and internal border of the supero-posterior part of the os coronæ. *Insertion*—of perforans; after piercing the two divisions of the flexor perforatus, opposite the pastern, it spreads out and covers the whole of the postero-inferior surface of the os naviculæ, to the postero-inferior part of the os pedis. *Action*—to flex the knee, and bend the fetlock and pastern joints.

Ulnaris Accessorius is situated on the posterior part of the arm, deep seated. *Origin*—from the whole of the internal concave surface of the ulna. *Insertion*—to the tendon of the flexor pedis, with which it blends. *Action*—to assist the perforans, and perforatus in flexing the knee, &c.

Extensor Suffraginis is situated on the postero-external part of the fore arm. *Origin*—from a tubercle in the posterior and external part of the radius; from the above bone as far down as the ulna reaches, and from the shaft border of the ulna. *Insertion*—to the supero-anterior part of

the os suffraginis, and to the capsular ligament of the fetlock joint. *Action*—to extend the fetlock.

Extensor Metacarpi Obliquus is situated on the infero-anterior part of the arm. *Origin*—from the infero-anterior and outer part of the radius, extending as high up as the middle part of its middle third. *Insertion*—after passing over the tendon of the extensor metacarpi magnus and underneath the tendon of the extensor pedis, to the supero-anterior part of the os metacarpi internum. *Action*—to confine the tendon of the extensor metacarpi in its place during action and to extend the leg.

Radialis Accessorius is situated on the infero-posterior part of the arm. *Origin*—from the posterior part of the middle of the radius. *Insertion*—to the tendon of the perforans, which it joins opposite the carpo-metacarpal articulation. *Action*—to assist the perforans.

Having removed and dissected the first extremity, we are now in a position to commence operations on the remainder of the body, which we will accomplish by commencing with the muscles of the head, from which point we can dissect back until we arrive and finish our task on the hind limbs.

MUSCLES OF THE HEAD.

ANTERIOR MAXILLARY REGION.

Zygomaticus.—Situation on the middle of the side of the face. *Origin*—from the anterior two-thirds of the zygomatic ridge. *Insertion*—to the angle of the mouth. *Action*—to retract the angle of the mouth.

Levator Labii Superioris Alæque Nasi is situated on and above the side of the face. *Origin*—from the lachrymal, malar, and superior maxillary bones. *Insertion*—to the supero-posterior part of the nasal opening, and to the antero-inferior part of the nostril and upper lip. *Action*—to dilate the nostrils and to retract the upper lip.

Retractor Labii Superioris is situated on the side of the face. *Origin*—from the anterior part of the zygomatic ridge, and from the anterior part of the superior maxillary bone. *Insertion*—to the sides of the nostril and supero-lateral parts of the upper lip. *Action*—to retract the upper lip.

Nasalis Longus Labii Superioris is situated on the upper part of the face. *Origin*—from the infero-external part of the lachrymal and malar bones and from the inferior part of the superior maxil-

lary bone ; at the above cartilages of the nose ; the tendons, the one on the right side and the other on the left, blend together and unite in one common tendon, which is inserted upon the superior part of the upper lip *Action*—to corrugate the upper lip, and thence to raise it.

Caninus is situated over the two anterior molar teeth. *Origin*—from the superior maxillary bone, near its juncture with the anterior maxilla. *Insertion*—to a roughened depression on the inferior maxillary bone, just behind the lower tusk. *Action*—to assist in closing the mouth.

Buccinator is situated between the upper and lower jaws. *Origin*—from the tuberosity of the superior maxillary bone, and from the outer walls of the alveolar cavities of the upper molar teeth. *Insertion*—to the outer walls of the alveolar cavities of the lower molar teeth. This muscle is blended with the obicularis oris. *Action*—to draw back the angle of the mouth, and tighten the outer wall of the mouth.

Retractor Labii Inferioris is situated on the anterior part of the lower jaw. *Origin*—from the external part of the lower jaw, just behind the last molar tooth. *Insertion*—to the inferior part of the lower lip. This muscle blends with the orbicularis oris. *Action*—to retract the lower lip.

Dilatator Naris Anterior is situated in front of and between the nostrils. *Origin*—from the supero-anterior surface of the os nasi. *Insertion*—to the anterior part of alveolar cartilages, and blends with the orbicularis oris. *Action*—to raise the upper lip.

Nasalis Brevis Labii Superioris is situated behind the nostrils. *Origin*—from the superior and anterior maxillary bones, and from the suture uniting them. *Insertion*—to the supero-anterior part of the septum nasi, and to the skin of the false nostrils. *Action*—to dilate the nostrils.

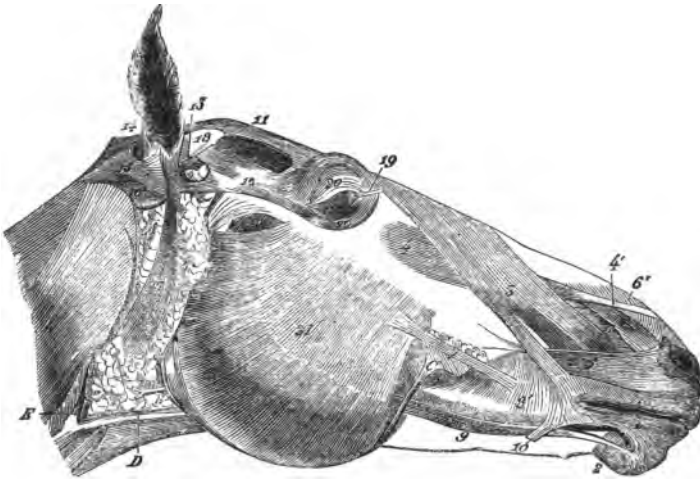
Depressor Labii Superioris lies upon the anterior part of the upper jaw. *Origin*—from the anterior maxillary bone, and from the outer border of the alveoli of the incisor teeth, extending as far back as the tusk. *Insertion*—to the upper lip and inferior nasal cartilages. *Action*—to assist in dilating the nostrils, and in retracting the upper lip.

Orbicularis Oris. This sphincter muscle is situated within the border of the lips. *Origin*—from the outer surfaces of the superior and inferior maxillary bones. *Insertion*—it interlaces with its own fibres at the angles, and is also attached to the glandular substance and skin of the lips. *Action*

—to contract the opening of the lips, and compress them against the jaws.

Naso Transversalis is situated between the two aleal cartilages. This muscle runs between the antero-internal borders of each cartilage to which it is attached, and its *action* tends to approximate them.

Cornealis Transversus Vertebræ.—Situation, between the two corneal cartilages. *Origin and insertion*—from the antero-internal border of one corneal cartilage, to the anterior and inner border of the other. *Action*—to draw the corneal cartilages forward by approximating them.



SUPERFICIAL MUSCLES OF THE HEAD.

1. Orbicularis Oris. 2. Levator Menti. 3. Levator Labii Superioris Alæque Nasi. 4. Nasalis Longus Labii Superioris. 4'. Terminal Tendon. 5. Dilatator Naris Lateralis. 7. Zygomaticus. 8. 8'. Buccina-

tor and Caninus. 9. Retractor Labii Inferioris. 11. Tempero Auricularis. 12. Zygomaticus Auricularis. 13. Scuto Auricularis Internus. 14. 15. 16. Cervico Auricularis. 17. Parotico Auricularis. 18. Scutiform Cartilage. 19. Tendon of. 20. Orbicularis Palpebrarum. 21. Masseter Externus. A. Parotid Gland. B. Origin of the Stenonian Duct. C. Termination of the Duct. D. E. Branches of the Jugular Vein.

Intranasalis.—Situation, within the nostril. *Origin*—from the externo mesian part of the anterior maxilla, some fibres to the depressor labii superioris. *Insertion*—to the cartilaginous portion of the inferior tubercled bone. *Action*—to approximate the nostrils.

INFERO-ANTERIOR MAXILLARY REGION.

Depressor Labii Inferioris.—Situation, along the side of the lower jaw. *Origin*—from the tuberosity of the superior maxilla. *Insertion*—to the superior border of the inferior maxilla, behind its alveoli, to the infero-lateral part of the lower lip. *Action*—to depress the lower lip.

Levator Labii Inferioris.—Situation, anterior part of the lower jaw near the incisor teeth. *Origin*—from the anterior part of the inferior maxillary bone, from the tusk to the central incisor. Opposite the central incisors the fibres decussate. *Insertion*—to the glandular substance of the lower lip. *Action*—to raise the lower lip.

MUSCLES WHOSE OFFICE IT IS TO MOVE THE
LOWER JAW.

Temporalis is situated on the top and sides of the head. *Origin*—from the tubercle on the crest of the occiput. Os triquatum, the whole of the external surface of parietal bone, and the cranial part of the squamous temporal bone, and from the inner surface of the orbital portion of the frontal bone. *Insertion*—to the summit anterior border, and both surfaces of the coronoid process of the lower jaw. *Action*—to open and slightly rotate the mouth.

Stylo Maxillaris is situated behind the lower jaw. *Origin*—from the whole of the antero-external surface of the styloid process of the occiput. *Insertion*—to the whole of the postero-internal border of the lower jaw.

Digastricus “Biventral” is situated along the inner side of the lower jaw. *Origin*—in common with the stylo maxillaris, from the antero-inferior part of the styloid process of the occiput ; in its course, it passes through a sheath formed by the hyoideus magnus, where it becomes tendinous ; having passed this point, it again becomes fleshy, whence its name, digastric, (double bellied.) *Insertion*—anterior tendon to the postero-inferior and inner surface of the lower molar teeth, from the first to

the anterior part of the last. Inferior tendon to the symphysis of the lower jaw. *Action*—a muscle of deglutition.

Masseter Externus forms the prominence of the cheek. *Origin*—from the inferior surface of the zygomatic ridge. *Insertion*—to the whole of the external surface of the angle of the lower jaw. This muscle has three strong attachments to corresponding ridges existing on the external surface of the inferior maxillary bone. *Action*—to close the mouth.

POSTERIOR MAXILLARY REGION.

Masseter Internus.—Situation, inner side of the branch of the lower jaw. *Origin*—from the infero-internal part of the pterygoid process of the sphenoid bone, pterygoid process of the palatine bone, and from posterior border of the pterygoid bone. *Insertion*—to the inner surface of the broad part of the branch of the lower jaw, as low as its angle. *Action*—to draw the under jaw upwards.

Pterygoidus.—Situation, inner surface of the branch of the lower jaw. *Origin*—from the outer part of the pterygoid process of the sphenoid bone, and outer surface of the pterygoid bone. *Insertion*—

to the supero-internal part of the branch of the lower jaw. *Action*—causes lateral motion.

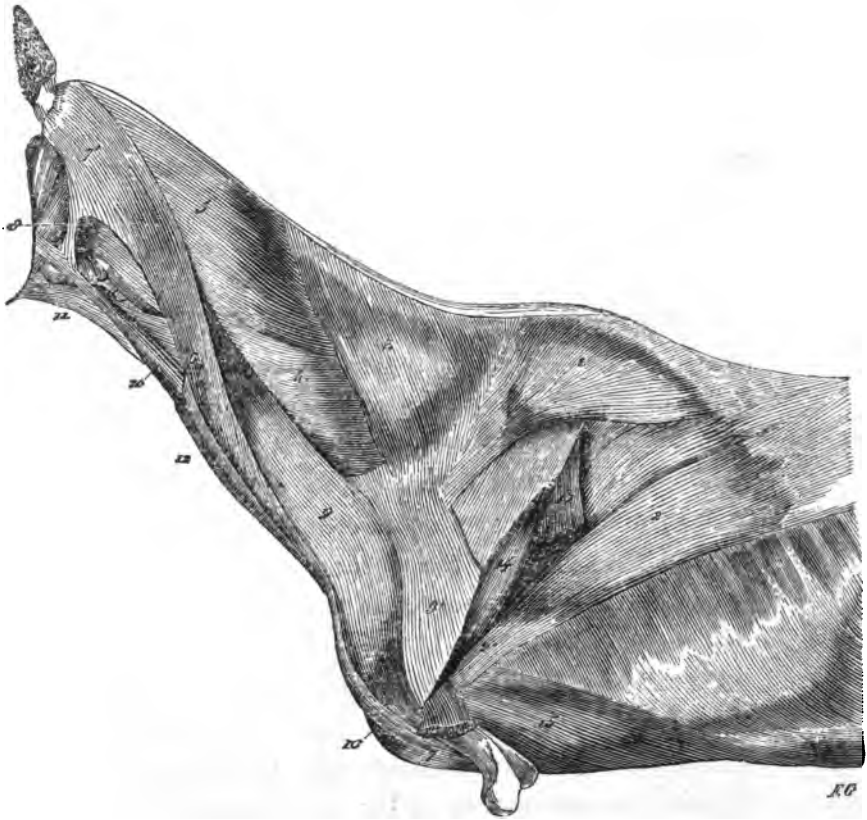
MUSCLES OF THE EYELIDS.

Levator Palpebræ Superioris—Situation, upon the upper and inner part of the orbit. *Origin*—from the root of the orbital process of the frontal bone. *Insertion*—to the supero-internal part of the upper eyelid. *Action*—to draw the eyelid upward.

Orbicularis Palpebrarum.—Situation, in front of the orbital brim. This muscle is divided into a superior and an inferior portion. *Origin of the superior portion*—from the orbit extending from the superior part of the outer canthus to the superior part of the inner canthus. *Insertion*—to the palpebral ligament and skin. *Action*—to raise the eyelid. *Origin of inferior portion*—from the orbit extending from the inferior part of the outer canthus to the inferior part of the inner canthus. *Insertion* to the palpebral ligament and skin. The fibres of these two divisions decussate at the Canthi. *Action*—to close the eyelids.

SUPERIOR CERVICO OCCIPITAL REGION.

Splenius is situated on the superior part of the neck. *Origin*—from the three anterior dorsal



VIEW OF THE SUPERFICIAL MUSCLES OF THE CERVICAL
AND DORSAL REGIONS.

1. Trapezius. 2. Latissimus Dorsi. 3. Cervical portion of Trapezius.
4. Serratus Magnus. 5. Splenius. 6. 9. Levator Humeri. 7. Humeral Insertion of Levator. 7¹. Occipital Insertion of Levator. 8. Slip of Muscle from the Levator, blending with the Sterno-Maxillaris. 10. Sterno-Maxillaris. 11. Subscapulo Hyoideus. 12. Portion of Pan-niculus Carnosus. 13. Portion of Caput Magnum. 14. Posterior belly of Scapulo Humeralis Externus. 15. Pectoralis Transversus.

spines. *Insertion*—to the mastoid process of the petrous portion of the temporal bone, crest of the occiput, wing of the atlas; transverse process of the second, third, fourth, and fifth cervical vertebræ; and to the lateral parts of the ligamentum colli. *Action*—to draw the head on one side, when one muscle acts; when both together, to erect the head.

Complexus Major is situated under the splenius. *Origin*—from the transverse processes and spines of the six anterior dorsal vertebræ. *Insertion*—to the oblique processes of all the cervical vertebræ, wing of the atlas, tubercle on the occipital crest, lateral parts of the ligamentum colli, and by blending with the tendon of the splenius to the mastoid process of the petrous portion of the temporal bone. *Action*—to erect the head.

Trachelo Mastoideus is deeply seated under the splenius. *Origin*—from the transverse processes of the two anterior dorsal spines. *Insertion*—to the oblique processes of all the cervical vertebræ, wing of the atlas, and mastoid process of the petrous portion of the temporal bone. *Action*—similar to the splenius.

Complexus Minor.—Situation, on the poll, underneath the anterior part of the complexus major. *Origin*—from the posterior part of the spine of the

dentata. *Insertion*—to the superior part of the scabrous pit of the occiput. *Action*—to raise the head and neck.

Rectus Capitis Posticus Major.—Situation, upon the poll. *Origin*—from the anterior part of the spine of the dentata. *Insertion*—to a roughened depression just below the crest of the occiput. *Action*—to pull the head backwards and raise it.

Rectus Capitis Posticus Minor.—Situation, upon the side of the poll. *Origin*—from the anterior part of the wing of the atlas. *Insertion*—to an eminence just below the scabrous of the occiput, and to the capsular ligament of the joint. *Action*—to straighten the head on the atlas.

Obliquus Capitis Superior.—Situation, upon the lateral part of the poll. *Origin*—from the anterior tubercle of the wing, and from the whole of the underneath surface of the anterior border of the wing of the atlas. *Insertion*—to the posterior margin of the crista of the occiput, extending from its tubercle to its styloid process. *Action*—to assist in the act of nodding.

Obliquus Capitis Inferior.—Situation, deep-seated, upon the supero-anterior and lateral parts of the neck. *Origin*—from the lateral part of the spine, and from the supero-lateral part of the arch of the dentata. *Insertion*—to the external surface of

54 INFERIOR CERVICO OCCIPITAL REGION.

the wing, and to the outer surface of the anterior border of the atlas, and to the capsular ligament. *Action*—to assist in drawing the head on one side.

INFERIOR CERVICO OCCIPITAL REGION.

Rectus Capitis Anticus Major.—Situation, deep-seated, on the antero-lateral part of the neck. *Origin*—from the transverse processes of the fifth, fourth, third and second cervical vertebræ, and inferior part of the dentata. *Insertion*—to a roughened place on the postero-inferior part of the os sphenoides. *Action*—to depress the head.

Rectus Capitis Anticus Minor.—Situation, at the back part of the cavity, at the fauces. *Origin*—from the inferior part of the ring of the atlas, just below a tubercle. *Insertion*—to the postero-inferior part of the sphenoid bone, just behind the insertion of the rectus capitis anticus major. *Action*—to assist the complexus major.

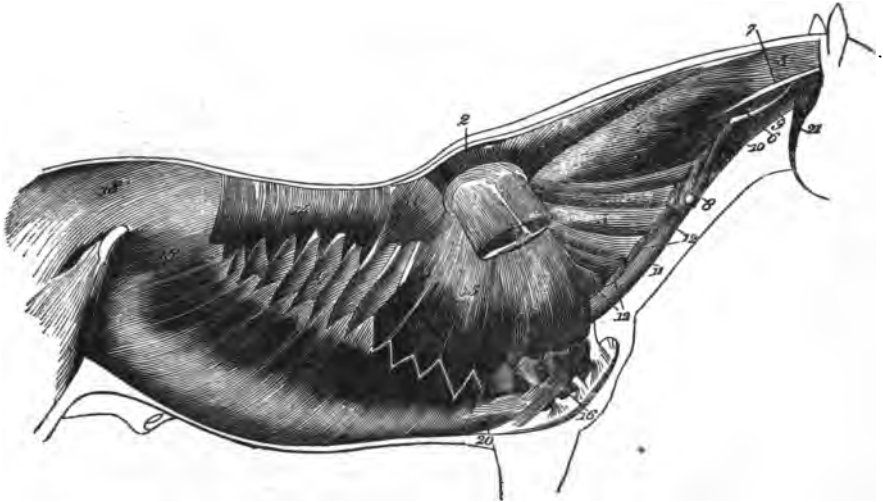
Obliquus Capitis Anticus.—Situation, to one side at the back of the fauces. *Origin*—from the infero-mesean part of the wing of the atlas. *Insertion*—to the postero-internal part of the inferior half of the styloid process of the occiput. *Action*—to depress and at the same time depress the head.

INFERIOR CERVICAL REGION.

Sterno-Maxillaris is situated on the inferior part of the neck. *Origin*—from the supero-anterior part of the cariniform cartilage. *Insertion*—(opposite the thyroid body it becomes tendinous)—to the posterior angle of the inferior maxillary bone. *Action*—to depress the lower jaw, and, through it, the whole head.

Sterno-Thyro Hyoideus.—Situation, inferior part of the neck. *Origin*—from the infero-internal part of the first rib, and from the supero-anterior part of the cariniform cartilage. *Insertion*—(half way up the neck it bifurcates) one to the postero-external border of the thyroid cartilages, the other to the spur process of the os hyoides. *Action*—to draw the tongue and larynx backwards and downwards.

Longus Colli.—Situation, deep-seated. Along the inferior part of the neck, and a short distance on the back. *Origin*—from the bodies of the six anterior dorsal vertebræ. *Insertion*—to the inferior bifurcation of the transverse processes of all the cervical vertebræ, and to a tubercle on the ring of the atlas. *Action*—to flex the neck.



SUPERFICIAL MUSCLES OF THE NECK, LOINS AND ABDOMEN.

1. Ligamentum Colli. 2. Rhomboidei. 3. Serratus Magnus.
4. Splenius. 5. Portion of Levator Humeri. 6. Complexus Major.
7. Tendon of same. 8. Cervical Insertions of the Levator Humeri.
9. Tendon common to the Levator Humeri-Splenius and Complexus Major.
10. Longus Colli. 11. Scalenus Inferior. 12. Scalenus Superior.
13. Transversalis Costarum. 14. Longissimus Dorsi. 15. Serratus Magnus.
16. Sterno Costalis. 17. Intercostales Externi. 18. Obliquus Abdominis Externus.
20. Insertion of Obliquus Abdominis Externus. 21. Diaphragm.

LATERAL CERVICAL REGION.

Scalenus Magnus.—Situation, on the postero-inferior parts of the neck. *Origin*—from the anterior border of the middle third of the first rib.

Insertion—to the transverse processes of the third, fourth, fifth and sixth cervical vertebræ. *Action*—to aid in depressing the neck, and in rolling the ribs outwards and forwards.

Scalenus Parvus.—Situation, posterior part of the neck. *Origin*—from the anterior border of the superior third of the first rib. *Insertion*—to the transverse process of the last cervical vertebræ. *Action*—to assist the foregoing muscle.

Spinalis Colli.—Situation, deep-seated on the side of the neck, between the oblique and spinous processes. *Origin*—from the oblique processes of the five posterior cervical vertebræ, and from that of the first dorsal vertebra. *Insertion*—to the spinous processes of all the cervical vertebra, except the atlas. *Action*—to curve the neck, and produce that formation known as ewe neck.

Semispinalis Colli.—Situation, deep-seated on the vertebræ. *Origin*—from the oblique processes of the five posterior cervical vertebræ. *Insertion*—to the spines of all the cervical vertebræ, except the atlas, and the two last, viz. : the sixth and seventh. *Action*—to assist in producing that formation known under the appellation ewe neck.

Musculi Cervicis.—In the neck, very small muscles are met with extending from the oblique process to the transverse process, and from trans-

verse process to oblique process. Their action is to assist in curving the neck from within outwards, and vice versâ.

COSTAL REGION.

Intercostales Externi.—Fill up the intercostal spaces. *Origin*—from the external edge of the posterior border of one rib. *Insertion*—to the internal edge of anterior border of the rib immediately behind the former.

Intercostales Interni.—Situation, underneath the former. *Origin*—from antero-internal edge of the border of one rib. *Insertion*—to the postero-internal edge of the rib immediately before it. *Action*—these muscles alternately act, and thus become muscles of inspiration by enlarging and decreasing the thoracic capacity.

STERNAL REGION.

Lateralis Sterni.—Situation, antero-inferior part of the thorax. *Origin*—from the third, fourth and fifth bones of the sternum, and from the posterior border of the inferior third of the first ribs, it plays over the second rib, through the medium of a synovial sheath. *Insertion*—to the cartilages of the third, fourth and fifth ribs, when it blends

with the rectus abdominis. *Action*—to assist the intercostals in contracting the chest.

Sterno Costales Externi.—Situation, on the external surface of the sterno-costal cartilages. *Origin*—from the lateral parts of the sternum, from just posterior to the posterior articulations of the sterno-costal cartilages with the sternum. *Insertion* to the antero-external borders of all the cartilages of the true ribs, from the second to the seventh.

Sterno Costales Interni.—Situation, internal surface of the sterno-costal cartilages. *Origin*—from the internal part of sternum just behind the articulations of the costo-sternal cartilages. *Insertion*—to the antero-internal borders of the cartilages of the true ribs, from the second to the seventh inclusive. *Action*—to assist the intercostals.

DORSO-COSTAL REGION.

Superficialis Costarum.—Situation, superficially placed. Lateral parts of the back and ribs. This muscle is divided for description into two portions; an anterior, the muscular fibres of which look from before backwards; and a posterior, the fibres of which look from behind forwards. *Origin of the anterior portion*—from the second to the eleventh dorsal spines. *Insertion*—to the antero-external

border of the sixth to the twelfth ribs, extending inferiorly as low as their angles. *Origin of the posterior portion*—from the twelfth dorsal spine to the second anterior lumbar spine. *Insertion*—to the postero-external border of the six remaining ribs, extending as low inferiorly as their angles. *Action*—a muscle of respiration, draws the ribs forwards and upwards, outwards and backwards, and elongates the abdomen.

Transversalis Costarum.—Situation, upon the supero-lateral parts of the thorax. This muscle consists of two layers, an external and inferior layer, and an internal and upper layer. The fibres of the external layer run from behind forwards. The fibre of the internal run from behind backwards. *Origin of the internal portion*—from the transverse process of the three anterior lumbar vertebræ. *Insertion*—to the antero-external border of all the ribs except the two last. *Origin of the internal layer*—from the transverse process of the last cervical vertebræ. *Insertion*—to the postero-external border of the ribs except the two first. *Action*—it is a muscle of expiration. It assists the animal in rearing, and kicking, and straightens the back.

Levatoris Costarum.—Situation, deep-seated. Upon the back. *Origin*—from the trans-

verse processes of the first to the fifteenth, and from the oblique processes of the sixteenth and seventeenth dorsal vertebræ. *Insertion*—to the anterior borders of all the ribs just above their angles. *Action*—to raise the ribs upwards and outwards, and is also a muscle of inspiration.

DORSAL REGION.

Longissimis Dorsi (Ilio Spinalis).—Situation, upon the supero-lateral parts of the and loins. *Origin*—from the spinous and transverse processes of the two anterior, or a transverse alone of the third sacral bones, and from the posterior and antero-inferior spinous, underneath part of the coista, and triangular space on the venter surface of the ileum—transverse, oblique, and spinous processes of all the lumbar vertebræ, and six posterior dorsal vertebræ, and transverse processes of all the remaining dorsal vertebræ. *Insertion*—to the angles of all the ribs except the two first, and transverse processes of the four posterior cervical vertebræ. *Action*—to assist in kicking, when the posterior part is made a fixed point, it will raise the fore part, and thus assist in rearing, leaping, and is also a muscle of respiration.

Spinalis Dorsi.—Situation, on the sides of the

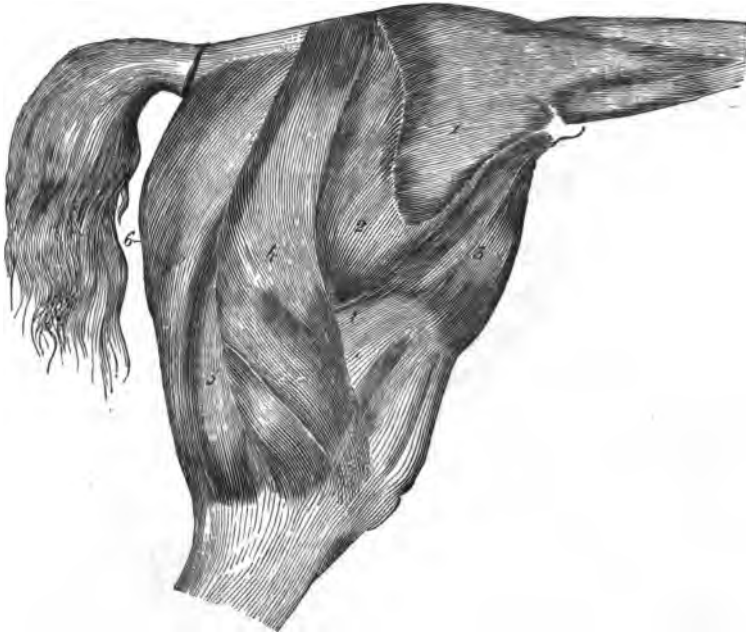
withers. *Origin*—from the second to the twelfth anterior dorsal spine, inclusive from the twelfth to the sixth, from the summit, and from the fifth to the second, from the postero-external border just below the summits of the spinous processes of the dorsal vertebræ. *Insertion*—to the spinous and oblique processes of the three posterior cervical vertebræ. *Action*—to assist the longissimus dorsi in rearing, and in raising the fore extremities in galloping.

Semispinalis Dorsi.—Situation, deep-seated on the back. *Origin*—one portion from the oblique processes of the five posterior dorsal vertebræ. *Insertion*—to the posterior border of the species just anterior to the oblique processes of the vertebræ next to them. Second portion. *Origin*—from the transverse processes of the remaining dorsal vertebræ except the first. *Insertion*—to the posterior border of the dorsal spines just anteriorly situated. *Action*—to assist in curving the back inwards and outwards.

MUSCLES OF THE HAUNCH.

GLUTEAL REGION.

Gluteus Externus on the top part of the haunch. *Origin*—from the spine of the third sacral bone and lower tubercle on the antero-inferior



SUPERFICIAL MUSCLES OF THE HAUNCH AND THIGH.

1. Gluteus Maximus. 2. Gluteus Externus. 3. Tensor Vaginæ. 4. Vastus Externus. 5. Portion of Triceps Abductor Femoris. 5¹ Semi-tendinosus. 6. Semi-membranosus. These last two-named Muscles form the Biceps Rotator Tibialis.

spinous process of the ileum. *Insertion*—to the anterior part of the trochanter minor externus.

Gluteus Maximus is situated on the middle part of the haunch. *Origin*—from the ligamentous structure of the longissimus dorsi, from the spine of

the second and third sacral bones, the sacro-sciatic ligament, the top of the supero-posterior spine, the antero-inferior spine, crista, and dorsal surface of the ileum. *Insertion*—to the posterior part of the trochanter major externus and superior part of the tubercle.

Gluteus Internus is situated under the maximus. *Origin*—from the posterior half of the dorsum ilii and small portion of the ischium. *Insertion*—to the upper part of the tubercle at the head of the femur. The *Action* of the glutei are to extend the femur on the pelvis, and to assist in the acts of kicking and rearing. They are the main propellers of the body.

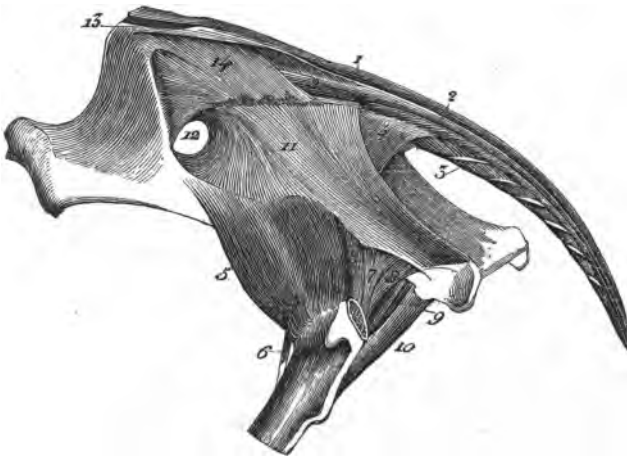
PELVI TROCHANTERIAN REGION.

Pyriformis.—Situation, on the sides of the pelvic cavity. *Origin*—from the transverse process of the first sacral bone, from the venter ilei, and from the anterior part of the pelvic brim. *Insertion*—with the obturator externus to the hollow behind the trochanter major externus. *Action*—to extend the haunch.

Obturator Externus. — Situation, underneath part of the public bones. *Origin*—from the underneath part of the pubis as far back as where it joins the ischial bone, and from the antero-internal

and posterior margin of the obturator foramen. *Insertion*—to the inferior part of the hollow, situated behind the trochanter major. *Action*—to extend the haunch.

Obturator Internus.—Situation, upon the lower side of the pelvic cavity. *Origin*—from the whole of the superior surface of the ischium, and from the crista on the tuberosity of the same bone,



MUSCLES OF THE TAIL, AND THOSE WHICH ENTER DIRECTLY INTO THE FORMATION OF THE COXO-FEMORAL ARTICULATION.

1. Sacro Coccygis Superior. 2. Sacro Coccygis Lateralis. 3. Sacro Coccygis Inferior. 4. Ischio Coccygis. 5. Gluteus Internus. 6. Rectus Parvus. 7. Obturator Internus. 8. Gemini. 9. Fascia of same. 10. Ischio Femoralis. 11. Sacro Sciatic Ligament. 13. Superior Ileo Sacral Ligament. 14. Inferior Ileo Sacral Ligament.

“it winds round the ischiatic notch, and joins the tendon of the pyriformis.” *Insertion*—to the hollow behind the trochanter major externus. *Action*—to rotate the haunch outwards.

Gemini.—Situation, just above the acetabulum. *Origin*—from the anterior part of the neck of the ischium, just above the acetabulum. *Insertion*—to the superior part of the hollow behind the trochanter major externus. *Action*—to rotate the femur.

Ischio Femoralis.—Situation, posterior part of the femoro-cotyloid joint. *Origin*—from the antero-external part of the tuberosity of the ischium. *Insertion*—to the posterior part of the femur, between the trochanter minor, externus and internus. *Action*—to raise the femur.

ANTERIOR ILEO FEMORAL REGION.

Tensor Vaginæ Femoris is placed on the antero-external part of the haunch. *Origin*—from the outer part of the lower tubercle on the antero-inferior spinous process of the ileum. *Insertion*—to the superior part of the patella. *Action*—to assist in extending the thigh.

Rectus Femoris forms the anterior prominence of the haunch. *Origin*—from the ileum, just above the acetabulum. *Insertion*—to the anterior

part of the capsular ligament and supero-lateral part of the patella. *Action*—to extend the thigh and draw it under the body.

Tri-femero Rotuleus consists of a vast mass of muscle occupying the front and sides of the femur, and lying beneath the rectus. It is usually divided into the vastus externus and internus and cruralis.

Vastus Externus.—Situation, antero-external side of the haunch. *Origin*—from the supero-external part of the trochanter major externus, and from the anterior part of the trochanter minor internus, and from the antero-external body of the femur. *Insertion*—to the supero-external and lateral part of the patella.

Vastus Internus.—Situation, antero-internal part of the haunch. *Origin*—from the anterior part of the neck, and from the anterior part of the trochanter minor internus, and from the antero-internal part of the bone, “reaching to the condyles.” *Insertion*—to the supero-internal part of the patella.

Crureus.—Situation, in the hollow between two vasti-muscles and femur posteriorly. *Origin*—from the ileum, just above the acetabulum. *Insertion*—to the body of the femur, and the patella. *Action*—those three muscles assist the rectus in

extending the thigh, and in lifting the stifle under the body in progression.

Ilio Femoralis.—Situation, anterior part of the femoro-cotyloid joint. *Origin*—From a ridge just above a soleus on the dorsum surface of the ileum, just above and in front of the acetabulum. *Insertion*—to the supero-anterior part of the femur, between the trochanter minor externus and internus. *Action*—to assist in raising the femur.

INTERNAL ILEO FEMORAL REGION.

Sartorius lies on the antero-internal part of the haunch. *Origin*—from the inferior part of the transverse process of the first sacral bone and venter ilei. *Insertion*—to the inner and inferior part of the lateral ligament of the patella, and through the medium of the gracilis to the supero-internal part of the tibia. *Action*—to bend the leg and to draw it inwards.

Gracilis is situated on the internal part of the thigh. *Origin*—from the anterior and posterior ends of the symphysis pubis. *Insertion*—to the spinous ridge on the supero-internal part of the tibia. *Action*—to raise the leg and draw it inwards.

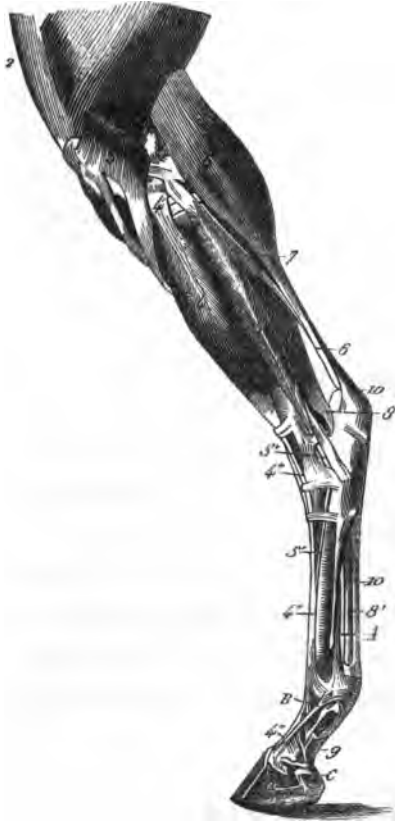
Pectineus.—Situation, inner, upper and ante-

rior part of the haunch. *Origin*—bifid. One from the superior surface of the other, from the antero-inferior part of the pectinean eminence on brim of the pelvis. *Insertion*—to the supero-anterior, and inner part of the femur, just below the trochanter minor internus. “The tendon of the rectus abdominis goes between the tendon of this muscle on the pectinean eminence.” *Action*—to abduct the femur.

Biceps Adductor.—Situation, deep-seated, on the inner part of the thigh. *Origin*—from the under surface of the pubic and ischial bones close to the symphysis pubis. *Insertion*—short head. To the postero-internal, and middle third of the femur. “Lower head.” To the inner condyle of the femur, a slip of tendon joins the ischio tibialis, and goes to the upper part of the tibia. *Action*—to extend the femur upon the pelvis, and to rotate it inwards.

POSTERIOR ILEO FEMORAL REGION.

Ischio Tibialis.—Situation, posterior part of the haunch and thigh. *Origin*—from the transverse process of the last sacral bones, and two anterior coccygeal bones, and from the posterior part of the tuberosity of the ischium. *Insertion*—to the



EXTERNAL VIEW OF THE MUSCLES OF THE HIND LEG.

1. Vastus Externus. 2. Tensor Vaginæ. 3. Insertion of Vastus.
 4. Extensor Pedis. 4¹. Tendon of Extensor Pedis (Superior attachment).
 4¹¹. Terminal Tendon of same. 5. Peroneus. 5¹. Tendon of same. 6.
 Gastrocnemius Externus. 6¹. Tendon of same. 7. Gastrocnemius In-
 ternus. Plantaris. 9. Insertion of the Gastrocnemius Internus. 10.
 Tendinous expansion of same, during its passage over the point of the os
 calcis. A. Superior Sesamoideal Ligament. B. Ligament bending down
 the extensors of the phalanges. C. Lateral Cartilage.

superior and antero-internal part of the tibia.
Action—to flex the tibia upon the femur.

Triceps Abductor Femoris occupies the postero-external side of the haunch and thigh. *Origin*—from the third and fourth spines of the sacrum, and from the anterior part of the tuberosity of the ischium. *Insertion*—by three attachments. *First*, to the posterior part of the femur and lateral part of the patella. *Secondly*, to the lateral part of the ligament extending from the patella to the spinous ridge on the tibia. *Thirdly*, to the ridge on the tibia and fascia, which binds down the flexors and extensors. *Action*—to rotate the leg and to turn the hock outwards.

Biceps Rotator Tibialis (Semi-tendinosus and Semi-membranosus) is situated on the postero-external side of the haunch. *Origin*—from the last bone of the sacrum, the two anterior coccygeal bones and posterior part of the tuberosity of the ischium. *Insertion*—to the antero-internal and mesian part of the tibia and fascia of the leg. *Action*—to rotate the leg.

MUSCLES OF THE THIGH AND LEG.

ANTERIOR FEMORAL CRURAL REGION.

Extensor Pedis lies superficially on the anterior part of the leg. *Origin*—from a depression on the antero-inferior and external part of the external condyle of the femur. *Insertion*—to the coronal process of the os pedis. This muscle in its passage downwards, passes over the head of the tibia, and below the hock receives two ligamentous slips from the superior sesamoideal ligament, and gives off tendinous slips to the os suffraginis and coronal bones. *Action*—to flex the hock and extend the foot.

Peroneus lies on the antero-external side of the leg. *Origin*—from the head of the fibula and outer part of the tibia. *Insertion*—to the supero-anterior part of the os suffraginis. *Action*—to assist the foregoing muscle.

Flexor Metatarsi is situated on the anterior-internal side of the leg. *Origin*—in common with the extensor pedis from the outer condyle of the femur. *Insertion*—to the large and small bones of the hock, and to the large and small metatarsal bones. *Action*—to flex the hock.

POSTERIOR FEMORO CRURAL REGION.

Gastrocnemius Externus lies along the posterior part of the leg. *Origin*—in two portions from the fossa just behind and above each condyle of the femur. *Insertion*—to a depression on the centre of the point of the os calcis. *Action*—to elevate the point of the hock and thus to extend the leg.

Gastrocnemius Internus is situated on the postero-mesial part of the leg. *Origin*—from the inner part of the ridge which surrounds the fossa behind and between the two condyles of the femur. *Insertion*—above the hock it becomes tendinous, and passes over the point (from which it is separated by a large bursa mucosa, the seat of capped hock), and descends along the back of the flexor tendons, where it corresponds with the flexor perforatus of the fore leg, to be finally attached to

INTERNAL VIEW OF THE MUSCLES OF THE HIND LEG.

1. Rectus Femoris. 2. Vastus Internus. 3. Pectineus. 4. Adductor Longus. 5. Adductor Brevis. 6. Semi-Membranosus. 7. 9. Extensor Pedis. 10. Ligament from the Superior Sesamoides, blending with the Tendon of the Extensor Pedis. 11. Gastrocnemius Internus. 11¹. Terminal Tendon. 12. Popliteus. 13. Flexor Pedis Perforans. 13¹. Terminal Tendon. 14. Flexor Pedis Perforans. 14¹. Terminal Tendon. 16. Tendon of Gastrocnemius Externus. 16¹. Tendon of Gastrocnemius Internus. A. Lateral Ligament (internal) of the tibio femoral articulation. B. Superior Sesamoides Ligament.

74 OSTERIOR FEMORAL CRURAL REGION.



the supero-posterior part of the os coronæ. *Action* to extend the hock and flex the fetlock and pastern joints.

Plantaris is situated on the postero-external part of the thigh. *Origin*—from the superior part of the head of the fibula. *Insertion*—to the supero-external part of the os calcis. *Action*—to assist in extending the hock.

Popliteus at the back of the stifle. *Origin*—from the lateral part of the external condyle of the femur, from which it winds round the head of the tibia. *Insertion*—to the supero-internal and posterior part of the tibia. *Action*—to flex the stifle joint.

Flexor Pedis Perforans is situated on the postero-external side of the leg. *Origin*—from the supero-external part of the tibia, from the body of that bone and to the posterior part of the fibula. *Insertion*—to the posterior part of the plantar surface of the os pedis. *Action*—to extend the hock and to flex the fetlock and pasterns.

Flexor Pedis Accessorius lies on the postero-internal part of the leg. *Origin*—from the supero-external part of the tibia and side of the fibula. Its *Insertion* is blended with the tendon of the flexor pedis.

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